

CLAIMS

What is claimed is:

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1. A rotational angioplasty device comprising:

a handle housing;

10 a rotatable prime mover carried by a prime mover carriage which is disposed within the handle housing, the prime mover carriage being longitudinally movable with respect to the handle housing;

15 an exchangeable drive shaft cartridge removably attachable to the handle housing further comprising:

a tubular core element mounted within the cartridge;

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a longitudinally movable tube disposed within the tubular element and having a proximal end portion which is removably attachable to the prime mover carriage for longitudinal movement therewith;

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a rotatable flexible drive shaft having a proximal portion which is disposed within the longitudinally movable tube and a distal portion which includes a tissue removal implement, said proximal portion having a shank at its proximal end;

a drive shaft attachment mechanism removably attaching the shank of the drive shaft to the prime mover; and

5 a coupling for connecting said moveable tube with said prime mover carriage and adjusting the relative position of said moveable tube and said proximal portion of said drive shaft, said coupling further comprising:

10 a prime mover carriage coupling element fixed to said prime mover carriage having a first surface forming one part of a coupling interface;

15 a second surface forming a second part of said coupling interface constructed on said moveable tube, said first and second coupling surfaces overlapping in a telescoping manner to form the coupling interface;

20 a retention groove constructed in one of said first and second coupling surfaces in said interface;

25 an index groove constructed in one of said first and second coupling surfaces in said interface;

30 an annular resilient element positioned in said retention groove and exerting a radial force between said first and second coupling surfaces; said resilient element expanding

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into said index groove when said retention
and index grooves are aligned;

5 wherein, in said aligned relation, the
moveable tube and said proximal portion of
said drive shaft are relatively positioned to
allow rotation of said drive shaft within
said moveable tube.

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2. A rotational angioplasty device, as described in
claim 1, wherein said shank is constructed with a
radial extending flange to engage abutment surfaces on
said moveable tube during axial movement of said tube
15 and wherein, in said aligned position of said retention
groove and said index groove, said flange is disengaged
from said abutment surfaces.

20 3. A rotational angioplasty device, as described in
claim 1, wherein said retention groove is constructed
in said first coupling surface and said index groove is
constructed in said second coupling surface.

25 4. A rotational angioplasty device, as described in
claim 1, wherein said retention groove is constructed
in said second coupling surface and said index groove
is constructed in said first coupling surface.

30 5. A rotational angioplasty device, as described in
claim 1, wherein said retention groove is constructed
having rectangular cross section.

6. A rotational angioplasty device, as described in
claim 1, wherein said index groove comprises an area of

reduced diameter from said coupling surface defined by
a first cam surface inclined from said area in a first
axial direction and a second cam surface inclined from
said area in a second axial direction, said second
5 axial direction being 180° from said first axial
direction.

7. A rotational angioplasty device, as described in
claim 6, wherein said annular resilient element tends
10 to be centered in said area of reduced diameter by the
action of said radial spring force on said first and
second cam surfaces.

8. A rotational angioplasty device, as described in
15 claim 1, wherein said annular resilient element
comprises a canted coil spring.

9. A rotational angioplasty device, as described in
claim 1, wherein to operationally engage the removable
20 drive shaft cartridge to the prime mover, said shank is
first fully engaged with said prime mover, wherein, in
such position, the annular resilient element is engaged
with the most forward of said first and second cam
surfaces to generate a force on said prime mover
25 carriage to urge said prime mover carriage in a
direction which tends to longitudinally align the
annular resilient element with the index groove.